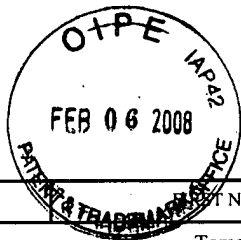




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| APPLICATION NO. | FILING DATE | INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|--------------------|---------------------|------------------|
| 10/572,904 | 03/21/2006 | Tomohiro Shinagawa | 127425 | 4744 |

25944 7590 02/05/2008
OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

EXAMINER

ALI, HYDER

ART UNIT PAPER NUMBER

3747

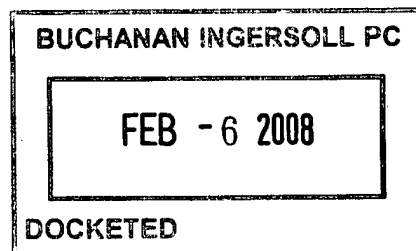
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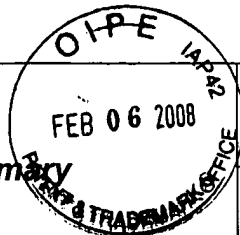
PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.



Office Action Summary



| | | |
|-----------------|------------------|--|
| Application No. | Applicant(s) | |
| 10/572,904 | SHINAGAWA ET AL. | |
| Examiner | Art Unit | |
| HYDER ALI | 3747 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Preliminary amendment filed on 3/21/2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-10, 13 and 14 is/are rejected.
- 7) ☒ Claim(s) 4, 11 and 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 7/26/07 & 6/28/07 & 3/21/06
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 6, 13, 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Cronyn (US 4,318,369).

As to Claim 1, Cronyn discloses a hydrogen-fueled internal combustion engine (12) that operates upon receipt of one or two or more types of fuel that are selected from hydrogenated fuel and a dehydrogenated product and hydrogen, which dehydrogenated product and hydrogen are obtained by dehydrogenating the hydrogenated fuel, the hydrogen-fueled internal combustion engine (12) comprising: a hydrogenated fuel storage section (128, see Fig. 7); reaction means (14) that includes a catalyst that is positioned to be heatable and dehydrogenates hydrogenated fuel, which is supplied from the hydrogenated fuel storage section, on the catalyst that is heated; separation means for separating hydrogen-rich gas and a dehydrogenated product that are derived from dehydrogenation and a dehydrogenated product storage section (130, see Fig. 7) for storing the separated dehydrogenated product. **See col. 3, lines 25-45 and col. 7, lines 27-55.**

As to Claim 6, Cronyn discloses a hydrogen-fueled internal combustion engine comprising: a hydrogenated gasoline tank (20) for storing hydrogenated gasoline

containing an organic hydride; fuel separation means (14) for separating the hydrogenated gasoline into hydrogen-rich gas and dehydrogenated gasoline; and fuel supply means for supplying at least the hydrogen-rich gas and/or the dehydrogenated gasoline on an individual basis or simultaneously, among the hydrogenated gasoline, the hydrogen-rich gas, and the dehydrogenated gasoline, to the internal combustion engine (12) as fuel.

As to Claim 13, Cronyn discloses a hydrogen-fueled internal combustion engine that operates upon receipt of one or two or more types of fuel that are selected from hydrogenated fuel and a dehydrogenated product and hydrogen, which dehydrogenated product and hydrogen are obtained by dehydrogenating the hydrogenated fuel, the hydrogen-fueled internal combustion engine comprising: a hydrogenated fuel storage section (128, see Fig. 7); reaction unit (14) that includes a catalyst that is positioned to be heatable and dehydrogenates hydrogenated fuel, which is supplied from the hydrogenated fuel storage section, on the catalyst that is heated; separation unit for separating hydrogen-rich gas and a dehydrogenated product that are derived from dehydrogenation; and a dehydrogenated product storage section (130, see Fig. 7) for storing the separated dehydrogenated product.

As to Claim 14, Cronyn discloses a hydrogen-fueled internal combustion engine comprising: a hydrogenated gasoline tank (20) for storing hydrogenated gasoline containing an organic hydride; fuel separation unit (14) for separating the hydrogenated gasoline into hydrogen-rich gas and dehydrogenated gasoline; and fuel supply unit for supplying at least the hydrogen-rich gas and/or the dehydrogenated gasoline on an

individual basis or simultaneously, among the hydrogenated gasoline, the hydrogen-rich gas, and the dehydrogenated gasoline, to the internal combustion engine (12) as fuel.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 5-10, 13, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qian et al (US 6,827,047) in view of Cronyn (US 4,318,369) or Fischer et al (DE 19931104).

According to a first embodiment and as shown in FIG. 1, Qian et al discloses a hydrogen-fueled internal combustion engine (1) that operates upon receipt of one or two or more types of fuel that are selected from hydrogenated fuel (2) and a

dehydrogenated product (17) and hydrogen, which dehydrogenated product and hydrogen are obtained by dehydrogenating the hydrogenated fuel, the hydrogen-fueled internal combustion engine comprising: a hydrogenated fuel storage section; reaction means that includes a catalyst that is positioned to be heatable and dehydrogenates hydrogenated fuel, which is supplied from the hydrogenated fuel storage section, on the catalyst that is heated; separation means for separating hydrogen-rich gas and a dehydrogenated product that are derived from dehydrogenation.

According to a first embodiment and as shown in FIG. 1, Qian et al discloses all the limitations of claim 1, except for a dehydrogenated product storage section for storing the separated dehydrogenated product.

The Examiner introduces Cronyn or Fischer et al or **according to a fourth embodiment and as shown in FIG. 4 of Qian et al patent** as the secondary references to show:

Cronyn discloses a dehydrogenated product storage section (20) for storing the separated dehydrogenated product. The dehydrogenated product returned to the storage section 20, to be replaced, periodically, with hydrogenated fuel supply. See col. 1, lines 23-28.

Fischer et al discloses a dehydrogenated product storage section (19) for storing the separated dehydrogenated product. The dehydrogenated product can be mixed with the hydrogenated fuel supply in the hydrogenated fuel tank 1. See Figure 1 and abstract.

According to a fourth embodiment and as shown in FIG. 4 of Qian et al patent discloses a storage tank (46) for temporarily storing the dehydrogenated product, so it

is possible to more promptly respond to the change in the operational state of an engine. **See col. 9, lines 5-20.**

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to provide a dehydrogenated product storage section for storing the separated dehydrogenated product as taught by either Cronyn or Fischer et al or according to a fourth embodiment and as shown in FIG. 4 Qian et al patent in the **first embodiment and as shown in FIG. 1** of Qian et al **since this structure of storage** would promote dehydrogenated product be mixed with the hydrogenated fuel supply and/or since this structure of storage would promote dehydrogenated product to be replace, periodically, with hydrogenated fuel supply and/or since this structure of storage would promote more promptly respond to the change in the operational state of an engine.

As to claim 2, Qian et al discloses according to a first embodiment and as shown in FIG. 1, valves (6, 9, 14, 16) for arbitrarily selecting one or more types of fuel.

As to claims 3 and 5, Qian et al discloses according to a first embodiment and as shown in FIG. 1, a catalyst for promoting the dehydrogenating reaction is provided in the reformer 5. **See col. 4, lines 40-65.** Official notice is also taken that storage section are both made of an elastic resin material were available at the time of the present application. See for example, Prasad et al (US 6,924,054) or Becerra et al (US 7,270,907) or Seery (US 5,038,960) or Hansen (US 3,477,610) for the disclosure of flexible fuel storage. Thus storage section is both made of an elastic resin material are old and well known. Official notice is also taken that a honeycomb carrier is used as a

catalyst carrier were available at the time of the present application. See for example, Abe (US 6,641,795) or Durante et al (US 5,733,518) or Abe et al (US 5,538,697). Thus honeycomb carrier is used as a catalyst carrier are old and well known.

As to claim 6, the claimed limitations of claim 6 are comparable to the rejected claim 1 above. See the rejection of claim 1 above.

As to claims 7-10, the claimed limitations of claim 7 are comparable to the rejected claim 2 above. See the rejection of claim 2 above.

As to claims 13 and 14, the claimed limitations of claims 13 and 14 are comparable to the rejected claim 1 above. See the rejection of claim 1 above.

Allowable Subject Matter

Claims 4, 11, 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Prasad et al (US 6,924,054), Becerra et al (US 7,270,907), Seery (US 5,038,960), Hansen (US 3,477,610), Abe (US 6,641,795), Durante et al (US 5,733,518), Abe et al (US 5,538,697) and Shinagawa et al (US 7,089,907).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HYDER ALI whose telephone number is (571) 272-4836. The examiner can normally be reached on M-F (8:30-5:00).

Application/Control Number:
10/572,904
Art Unit: 3747

Page 8

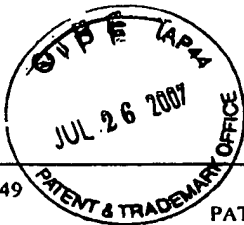
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Kirk Cronin can be reached on (571) 272-4536. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Hyder AZ

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STEPHEN K. CRONIN
SUPERVISORY PATENT EXAMINER

Sheet 1 of 1Form PTO-1449
(REV. 1/06)US Dept. of Commerce
PATENT & TRADEMARK OFFICEATTY DOCKET NO.
127425APPLICATION NO.
10/572,904

INFORMATION DISCLOSURE STATEMENT

(Use several sheets if necessary)

APPLICANT(S)
Tomohiro SHINAGAWA et al.FILING DATE
March 21, 2006GROUP
1745

U.S. PATENT DOCUMENTS

| Examiner Initials | Cite No. | Document Number | Date | Name |
|----------------------|-------------|-----------------|------------|-----------------|
| /HA/ | 1 | 2003/0168023 A1 | 09/11/2003 | Anderson et al. |
| /HA/ | 2 | 4,318,369 | 03/09/1982 | Cronyn |
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FOREIGN PATENT DOCUMENTS

| Examiner Initials | Cite No. | Document Number | Date | Country | With English Abstract | With English Translation |
|----------------------|-------------|------------------|------------|---------|-----------------------------|--------------------------------|
| /HA/ | 3 | DE 199 31 104 A1 | 01/11/2001 | GERMANY | | |
| /HA/ | 4 | EP 1 236 679 A2 | 09/04/2002 | EUROPE | | |
| /HA/ | 5 | WO 03/042521 A2 | 05/22/2003 | WIPO | | |
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OTHER DOCUMENTS

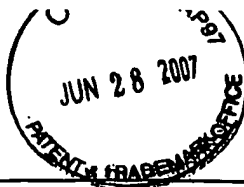
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EXAMINER /Hyder Ali/

DATE CONSIDERED 01/08/2008

Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: July 26, 2007

Sheet 1 of 1

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| Form PTO-1449 (REV. 1/06) | | US Dept. of Commerce PATENT & TRADEMARK OFFICE | | ATTY DOCKET NO. 127425 | | APPLICATION NO. 10/572,904 | |
| INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary) | | | | APPLICANTS Tomohiro SHINAGAWA et al. | | | |
| | | | | FILING DATE March 21, 2006 | | GROUP 1745 | |
| U.S. PATENT DOCUMENTS | | | | | | | |
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| Examiner Initials | Cite No. | Document Number | Date | Country | With English Abstract | With English Translation | |
| /HA/ | 1. | JP-A-2000-291499 | 10/17/2000 | JAPAN | X | X | |
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Date: June 28 2007

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| Form PTO-1449 (REV. 1/06) | | US Dept. of Commerce PATENT & TRADEMARK OFFICE | | ATTY DOCKET NO. 127425 | | APPLICATION NO. New U.S. National Stage of PCT/JP2004/015104 | |
| INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary) | | | | APPLICANTS Tomohiro SHINAGAWA et al. | | | |
| | | | | FILING DATE March 21, 2006 | | | |

| U.S. PATENT DOCUMENTS | | | | |
|-----------------------|----------|--------------------|------------|--------------------|
| Examiner Initials | Cite No. | Document Number | Date | Name |
| /HA/ | 1. | US 5,275,000 | 1/4/1994 | COFFINBERRY ET AL. |
| /HA/ | 2. | US 5,373,818 | 12/20/1994 | UNGER |
| /HA/ | 3. | US 2003/0168024 A1 | 9/11/2003 | QIAN ET AL. |

| FOREIGN PATENT DOCUMENTS | | | | | | |
|--------------------------|----------|------------------|------------|---------|-----------------------|--------------------------|
| Examiner Initials | Cite No. | Document Number | Date | Country | With English Abstract | With English Translation |
| /HA/ | 4. | JP A 2000-297706 | 10/24/2000 | JAPAN | X | X |
| /HA/ | 5. | JP A 2002-255503 | 9/11/2002 | JAPAN | X | X |
| /HA/ | 6. | JP A 1-170752 | 7/5/1989 | JAPAN | X | _____ |
| /HA/ | 7. | JP B2 3-9091 | 2/7/1991 | JAPAN | X | _____ |
| /HA/ | 8. | JP B2 5-18761 | 3/12/1993 | JAPAN | X | _____ |
| /HA/ | 9. | JP A 2001-110437 | 4/20/2001 | JAPAN | X | X |
| /HA/ | 10. | JP A 6-159096 | 6/7/1994 | JAPAN | X | X |
| /HA/ | 11. | JP A 2003-184667 | 7/3/2003 | JAPAN | X | X |
| /HA/ | 12. | JP A 2000-213444 | 8/2/2000 | JAPAN | X | X |

| OTHER DOCUMENTS | | |
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Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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| Notice of References Cited | Application/Control No. 10/572,904 | Applicant(s)/Patent Under Reexamination SHINAGAWA ET AL. | |
| | Examiner HYDER ALI | Art Unit 3747 | Page 1 of 1 |

U.S. PATENT DOCUMENTS

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | Classification |
|---|---|--|-----------------|------------------|----------------|
| * | A | US-7,089,907 | 08-2006 | Shinagawa et al. | 123/295 |
| * | B | US-6,827,047 | 12-2004 | Qian et al. | 123/3 |
| * | C | US-6,924,054 | 08-2005 | Prasad et al. | 429/34 |
| * | D | US-5,038,960 | 08-1991 | Seery, John T. | 220/723 |
| * | E | US-3,477,610 | 11-1969 | HANSEN CLAYTON C | 220/495.01 |
| * | F | US-7,270,907 | 09-2007 | Becerra et al. | 429/34 |
| * | G | US-6,641,795 | 11-2003 | Abe, Fumio | 423/648.1 |
| * | H | US-5,733,518 | 03-1998 | Durante et al. | 423/248 |
| * | I | US-5,538,697 | 07-1996 | Abe et al. | 422/171 |
| | J | US- | | | |
| | K | US- | | | |
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FOREIGN PATENT DOCUMENTS

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | Classification |
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NON-PATENT DOCUMENTS

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.